PWAS
Productivity of Water in Agriculture and Interacting Systems

COMPREHENSIVE Assessment of water management in agriculture

Research Brief No. 1 August, 2004

Current productivity of water for smallholder farmers in Mkoji Sub Catchment (MSC) of the Great Ruaha River Basin in Tanzania

MAIZE

About 23,079 households cultivate 2296 ha of rain-fed maize, which consume some 10.6 Mm3 of water with productivity water ranging between 0.04 to 0.1 USD/m3.

About 11,443 households cultivate 1304 ha of off-season irrigated maize, which consume 6.01 Mm3 of water with productivity being higher than rain-fed and ranging between 0.1 to 0.14 USD/m3

PADDY

Paddy is grown mainly during rain season with run-on the river supplementary irrigation.

Some 5266 households engage in paddy cultivation in 10,359 ha of land with total consumptive use of 35.52 Mm3 of water.

Productivity of water for paddy in Mkoji Sub-catchment ranges between 0.06 to 0.09 USD/m3.

BEANS

About 13415 households cultivate 1183 ha of beans during the rain season, which consume some 10.5 Mm3 of water with productivity of water ranging from 0.06 to 0.1 USD/m3.

About 11090 households cultivate 726 ha of beans in off-season irrigated agriculture, which uses some 2.54 Mm3 of water with productivity of water ranging between 0.13 to 0.15 USD/m3.

TOMATOES

Tomato is an important horticultural cash-earning crop in Mkoji Sub-catchment.
During rainfall season, some 3983 households engage in producing tomatoes in 518 ha of land consuming 2.5 Mm3 of water with an average water productivity of 0.08 USD/m3.

More than 6320 households engage in off-season irrigated tomatoes production in some 580 ha of land using 2.5 Mm3 of water.

Productivity of water for tomatoes is 0.27 USD/m3 being the highest recorded for all crops in Mkoji sub-catchment.

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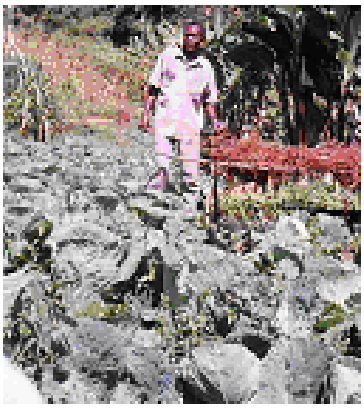

HIGH VALUE CROPS AND IRRIGATION

High value crops such as cabbages, tomatoes and onions give the highest productivity of water (ranging from 0.18 to 0.27$/m3) due to better water management and favourable cost of the produce.

Over 3000 households cultivate some 261 ha of irrigated onions consuming 1.37Mm3 of water with average productivity of 0.18USD/m3

Productivity of water in irrigated agriculture is generally higher (ranging between 0.10$/m3 to 0.27$/m3) than in rain-fed agriculture (i.e. 0.02USD/m3 to 0.21USD/m3).

WATER SCARCITY AND MICRO-IRRIGATION

During the dry season Irrigation water is scarce and competitive thus the farmers tend to manage and use water more carefully, avoiding unnecessary wastage.

In the micro irrigation systems water is mostly hand carried to irrigate high value horticultural crops, thus amount of water applied tend to be only sufficient to meet crop requirement

SORGHUM AND MILLETS CROPS WITH LOWEST PRODUCTIVITY WATER

Some 2735 households produces millets and sorghum in 3997 ha of land consuming some 9.56 Mm3 of water.

The lowest productivity of water was recorded with these crops ranging between 0.02 and 0.09$/m3 probably because it is grown in marginal soil with unreliable rainfall

SPRING WHEAT

Some 5026 households grow spring wheat in the upper Mkoji sub-catchment, in 362 ha of land and consuming some 1.34 Mm3 of rainwater. Productivity of spring wheat is 0.06 USD/m3 on average

GROUND NUTS

It is an important cash-earning crop grown by some 3592 households in some 1315 ha of land and consuming 6.85 Mm3 of water.

Groundnuts are grown under rain-fed system with productivity of water ranging between 0.12 to 0.21 USD/m3, relatively higher than many other crops due to favourable price of groundnuts.

LIVESTOCK

Livestock sector uses about 1.9% of water in Mkoji sub-catchment and produces up to about 5 $/m3 of livestock assets, being the highest productivity level attained among analysed water uses (i.e. Domestic, Brick making, livestock and crops) in MSC.

During the rain season some 22,325 households own a total of 300,000 TLU within the Mkoji sub-catchment and consumes a total of 1.5 Mm3 of water.

It was estimated that only some 99,000 TLU remain within the Mkoji sub-catchment during the dry season consuming about 1.1 Mm3 of water.

IMPORTING VITUAL WATER

During the dry season about 201,000 TLU are moved out of Mkoji sub-catchment in search of water and pasture, virtually importing water, which amounts to 2.39 million cubic metres, about twice the amount of water consumed by livestock staying back in the MSC during the dry season.

BRICK MAKING

A total of about 97323 households in Mkoji sub-catchment take part in brick making producing a total of 60 million bricks in each dry season

Brick making uses about 153,844 m3 of water from irrigation canals

Productivity of water in brick making is 2 USD/m3 considerably higher than crop water productivity

DOMESTIC WATER USE

Domestic water uses in Mkoji sub-catchment were estimated at 0.9 and 0.87 million cubic metres for wet and dry seasons, respectively.

Productivity of domestic water was estimated at 1 USD/m3.